	A	B	C	D
1				**TECHNOLOGY**
2				
3	**Criteria**			
4				Rubber Tire
5	I. FUNCTIONALITY	I.a	System capacity - 9000 pphpd	Attainable, and with several express, articulated buses, most of the passengers will be seated. Exclusive bus facilities in US have much higher real world capacities than LRT. Well over 10,000 pphpd
6		I.b	40 minute end to end runtime for First project	Average time will be much faster with express buses. The more the express buses, the lower the average TT. Some buses will offer nearly door-to-door service but most will require transfers.
7		I.c	Guideway switching and crossovers accommodate 2 minute headways	Not needed; TheBus drivers can follow in 10 second headways! Single guideway may make the provision of express buses difficult.
8		I.d	Can other manufactures provide interoperable vehicles	Plethora of buses and at least three guided BRT systems, in addition to Phileas.
9		I.e	Can multiple manufacturers provide interfacing systems equipment	Largely unnecessary, but there are many providers of interchangeable systems. Sole source providers of some "superbuses."
10		I.f	Would system comply with federal and state regulations, including ADA, Buy America Act, and NFPA 130	Substantially American. Fully ADA.
11		I.g	Features that reduce impact of construction	Generally light construction. Few, if any guideway stations will be required. Ramps every 2-3 miles are desirable for good access to buses.
12		I.h	Are there any geometric constraints that would add cost or limit performance	Most maneuverable vehicles. Easiest guideway for bus only-use.
13		I.i	Meets 75dBA maximum noise level at stations	Most likely, but stations are a minor issue. Relatively quiet at 50 mph cruising attitude.
14		I.j	Electrical propulsion, with power distribution via 3rd rail	An unnecessary and cumbersome power supply.
15		I.k	Bi-directional, fully automatic operation, capable of 2 minute headways, and capable of being coupled into multi-car consists	Can do but this criterion is unnecessary. Can do 2-way service at 2-minute headway.
16		I.l	Maximum platform length of 300 feet	This is a rather useless criterion
17		I.m	Yard and Maintenance Facility	A modest size facility is needed, largely a scaled up version of what TheBus already has.

	E	F	G	H	I
1	**Y SELECTION EVALUATION**				
2					
3	**Technology**				
4	Steel Wheel/Rail	Managed Lanes / HOT Lanes	**Weight**	Rubber Tire	Steel Wheel/Rail
5	Attainable by the trains but stations need to be "over-designed" to safely handle the crash loads. Also, about 2/3 of passengers will be standees. LRT appears limited to 10,000.	9000 is a routine, not a crash load for this type of facility.	**8**	90	75
6	This is a best case scenario with light to moderate loads. However, substantial access times will be required making the 40 minute trip a theoretical estimate.	Average time will be much faster with express buses. The more the express buses, the lower the average TT. Some door to door buses. Many door to door vans and cars.	**10**	75	50
7	Can do, but no express trains.	Not needed; TheBus drivers can follow in 10 second headways! Since the facility is minimally 2-lanes wide, there can be express buses as needed.	**2**	90	50
8	Limited market. At best, an oligopoly.	Plethora of buses and at least three guided BRT systems, in addition to Phileas.	**2**	100	50
9	Limited market. At best, an oligopoly.	Largely unnecessary, but many providers of interchangeable systems.	**1**	90	50
10	Most technology is truly foreign. Some component manufacture in the U.S. Fully ADA, but ADA stations are very expensive and require specialized equipment and 24x7 power.	Substantially American. Fully ADA.	**3**	100	50
11	Heavy vehicles and massive stations. Large and complex maintenance yard.	A 2-lane facility should be considered a light viaduct. Light live loads. No guideway stations. Ramps every 4-5 miles are desirable.	**3**	80	60
12	Sunstantial limitations in grades and turning radii. Least maneuverable vehicles. This is a major issue for tight in-town alignment. Will likely be very slow (like the Loop) with frequent squealing.	Very maneuverable vehicles, but most AASHTO design specifications need to be met since guideway may be open to general public motorists.	**5**	100	40
13	Criterion met at stations but likely exceeded when trains rumble at 40 mph along Kapiolani Blvd and other Honolulu roadways within 50 ft. from sleeping quarters.	Most likely, but stations are not an issue. Relatively noisy traffic at 60 mph. However, this fixed guideway does not have an in-town portion.	**4**	100	60
14	What is the advantage sought here?	An unnecessary and cumbersome power supply.	**0**		
15	This is what rail does best. It is a technology feature. Only relevant part is the 2-way service at 2-minute headway.	Can do but this criterion is unnecessary. Can do 2-minute headway. Reverse commute cal occur on relatively uncongested public arterials and freeways with light or moderate delays.	**5**	100	100
16	that does not correlate with performance. Long platforms have aesthetic issues.	Only rail needs long platforms.	**1**	75	25
17	A brand new facility is needed which consumes a lot of precious land. As an example, only the washing station for rail cars is a multilimillion dollar expense.	The facility TheBus already has is sufficient. Due to rapid turn-around times, bus fleet should be the same or less.	**5**	100	25

	J	K	L	M	N
1					
2					
3					
4	Managed Lanes / HOT Lanes				
5	100	100			
6	100	100			
7	100	100			
8	100	100			
9	100	100			
10	100	100			
11	100	100			
12	75	100			
13	90	100			
14		100			
15	75	100			
16	100	100			
17	100	100			

	A	B	C	D
18	II. COSTS	II.a	Guideway costs	Fewer stations and lighter structure, but it requires several ramps for good access to communities.
19		II.c	Vehicle and systems costs	Varies from common buses to magnetically guided "superbuses".
20		II.d	Proprietary technology unique costs	Few, if any.
21		II.e	On-going operating and maintenance cost	Fairly high driver and maintenance labor costs, but energy costs will be reduced in the future with advanced technologies. Low guideway costs.
22	III. TECHNOLOGY MATURITY	III.a	Has technology been proven in revenue service for at least five years	Yes.
23		III.b	Does the technology use proven off-the-shelf components	Yes, but some buses are too specialized.
24		III.c	Are there any technology risks to the proposed technology	Some, but a dedicated busway can be engineerd in such a way that if the transit service underperforms, then the facility can be openned up to other classes of vehicles, e.g., a mass transit and freight corridor, or converted into HOT lanes if lane width and geometry are sufficient. On an average day, exclusive busways are underutilized.
25		III.d	What guarantee is there for long term parts availability for replacement vehicles, systems equipment, spare parts and software support	A moderate issue. Some concerns with specialized superbuses.
26				
27				

	E	F	G	H	I
18	Medium size structure but many and heavy stations as well as long ramps to rail yard(s).	A two lane reversible guideway with a few ramps is the simplest and cheapest structure. If operated as a HOT-way, then tolls can pay for the guideway.	**10**	80	60
19	Expensive.	Common or hybrid buses and vans. By far the least expensive.	**4**	80	40
20	Several components and control architectures, software and mechanisms.	Practically none.	**1**	90	50
21	Much lower or minimal motorman costs but large administration, station crew, transit police and maintenance crew costs. Minimal ability to lessen Hawaii's fossil fuel dependency.	Fairly high driver and maintenance labor costs, but energy costs will be reduced in the future with advanced technologies. If operated as a HOT-way, then tolls can pay for the O+M and buy new buses too (as in San Diego, CA.)	**10**	60	20
22	Yes, but no experience in Hawaii with rail. Large, heavy and complex technology.	Yes, but no tolling experience. Tolling technology is light, computer driven and easy to manage with a small, specialized staff.	**10**	100	75
23	Yes, but it is provided by an oligopoly.	Yes, mostly dependent on the "common bus".	**4**	90	75
24	By far and wide the riskiest technology because if rail underperforms or fails, then there is little use for it and little ability to convert it to anything useful for transportation. There is no need for freight trains on Oahu. On an average day, the railway is underutilized.	Minimal risk and continuous use for transportation service, 24x7.	**10**	60	10
25	A moderate issue because supliers are an oligopoly.	Not an issue.	**2**	75	90
26					
27					

	J	K	L	M	N
18	100	100			
19	100	100			
20	100	100			
21	100	100			
22	90	100			
23	100	100			
24	100	100			
25	100	100			
26		**10000**	**84%**	**51%**	**96%**
27					

	A	B	C	D
28	IV. EVALUATOR'S ADDITIONAL CRITERIA	IV.a	Likelihood of providing an appreciable reduction in congestion	Express buses due to superior speed and accessibility will likely remove more motorists from existing highways.
29		IV.b	Likelihood of providing long term reduction in energy dependence, largely through adaptability to future technological and energy breakthroughs	Good. There are several hybrid and fuel cell buses available today. Many more by 2030.
30		IV.c	Likelihood of attracting a substantial mass transit ridership	TheBus is doing well. A sore item is reliability and congestion. Bus guideway and bus lanes improve these, so ridership should improve markedly. The more the emphasis on a fixed busway, the more transfers will be required, thus reducing overall atrractiveness.
31		IV.d	Compatible with technology and know-how in Hawaii	Oahu already familiar with hybrid buses. Most technologies are largely compatible with existing know how.
32		IV.e	Compatible with "Hawaiian sense of place"	Buses of various size are a familiar sight on Oahu. My rating assumes that a guideway goes through town. Much quieter than rail.
33		IV.f	An asset for emergency operations	Significant engineering modifications would be needed to make an elevated busway compatible with some emergency vehicles. A difficult proposition.
34		IV.g	Facilitates development in Leeward Oahu	Busways have huge people carrying capacities, therefore further development in LO is possible. A busway alone will not make a major "dent" in highway congestion. As long as congestion prevails, the opportunities for development are limited because the corridor provides a lower quality of life.
35		IV.h	Aesthetic impact in the waterfront and urban core	Major negative impact if guideway goes through town.
36		IV.i	Likely to generate issues with crime and homelessness	Very few bus systems require transit police and have substantial issues of this kind.
37		IV.j	Likely to generate issues with power production and distribution	Not an issue, particularly with future fuel cell vehicles.
38		IV.k	The local economy runs thanks to deliveries and tour operators. What about them?	Busway will be of no service to freight and tour operators and congestion reduction will be too small to have a noticable benefit to them. Unlikely that tour buses will be allowed on it.
39				
40				**Combin**
41				
42		**Evaluator's Notes:** (1) Monorail and Maglev technology evaluations were eliminated from the comparisons due to the limited informatio		

	E	F	G	H	I
28	Rail will likely remove the fewest motorists from existing highways.	Will likely remove more motorists from existing highways, and the network-wide travel times will be substantially lowered.	10	50	25
29	Rail has not changed much in the last 20 years and will not change much in the next 20 either.	Buses and cars will be very advanced in 20 years. Today's hybrids will be relics in 2030.	10	40	10
30	Has not happenned anywhere in the US and it'll be worse on Oahu where people have multiple jobs, many kids go to private schools and people love to participate in mulriple activities year-round. Rail works with transfers. Tranfers are cumbersome and waste time.	HOT lanes are a major success in the US without exception. A win-win for mass transit and motorists. The system is familiar and ready to perform from day one. Express buses between key origins and destinations minimize the need for transfers.	10	80	30
31	This technology is entirely foreign to Hawaii and will require new, specialiazed and expensive labor force to cope with it. Some breakdowns may be paralyzing.	Entirely familiar, except for electronic tolls, which can be done simply by license plate recognition and DMV billing. Over 99% of license plates on Oahu as standard Hawaii issue.	5	90	10
32	Who wants to visit Hawaii and find an elevated rail with steel wheels on steel rails disecting the town and disturbing the peace every other minute? Steel squeal is the new sound of aloha?	A narrow elevated expressway will have the same footprint at the rail guideway, but it will stop at Iwilei and won't affect the city and its residential neighborhoods. Part of it, the Nimitz Viaduct, has already gone through Environmental Review.	5	75	25
33	Generally incompatible with any emergency response.	Compatible with virtually all emergency response types. In major distasters, the guideway can be run as a lifeline corridor, allowing the area to recover, since most roads will be closed by debris, fallen poles, etc.	3	25	5
34	Light rail (which is most of the proposed rail cars) has genenally a modest capacity, is least convenient and obtains a generally low ridership. Rail will barely make a major "dent" in highway congestion. As long as congestion prevails, the opportunities for development in LO are limited because the corridor provides a lower quality of life.	HOT lanes are a major success nationally because they provide substantial new capacity, reduce travel times and reduce congestion. It is the only transportation investment that will improve quality of life and provide some opportunity for further development in LO.	6	50	10
35	Major negative impact because guideway goes through town.	Minimal impact since guideway stops in Iwilei.	2	60	10
36	Rail is a major generator of such issues.	Not an issue.	3	90	10
37	Substantial issue as most rail systems will consume over half the KW production of HECO's new $150 million power plant.	Not an issue. In 2030, fossil energy for vehicles will be substantially reduced.	3	90	10
38	Useless.	Tour buses can be directly accomodated and they should because they are high occupancy vehicles. Freight operations will benefit from the overall network congestion reduction. Commercial vans can use HOT lanes for a toll.	3	10	0
39					
40	**ed score from 33 criteria out of a possible maximum of 16,000 points**			**11965**	**6090**
41					
42	n provided and various technology-specific issues. Additionally, an evaluation of these systems as well as Personal Rapid Transit or PRT systems could not be reasonably conducted during th				

	J	K	L	M	N
28	100	100			
29	100	100			
30	100	100			
31	100	100			
32	100	100			
33	100	100			
34	100	100			
35	100	100			
36	100	100			
37	100	100			
38	100	100			
39		**6000**	**60%**	**16%**	**100%**
40	**15610**	**16000**	**75%**	**38%**	**98%**
41					
42	s evaluation				

	A	B	C	D	E	F	G	H	I	J
1	**Technology Selection**									
2	**Summary Report**									
3	**Panel Member:**	Panos D. Prevedouros, PhD								
4	**Preferred Technology:**	Rubber Tire Technology, on Managed Lanes								
5	**Discussion**	(1) Evaluation score card with explanations--"EVAL" (2)								